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PRELIMINARY

**REPORT**

ON

GEM LAKE (MEG GROUP)

COPPER PROSPECT

**PROPERTY FILE**

Nanaimo

MINING DIVISION

James J. McDougall  
Geologist

No 1

PROPERTY FILE

6

# PROPERTY FILE

PRELIMINARY REPORT  
ON  
GEM LAKE (NEG GROUP) COPPER PROSPECT

NANAIMO N. D., B. C.

by

James J. McDougall

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PRELIMINARY REPORT  
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NANAIMO M. D., B. C.

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INTRODUCTION:

Widespread copper mineralization occurs in a structurally favorable zone near the bottom of a deep cirque in the Forbidden Plateau mountains west of Courtenay on Vancouver Island. The nature and environment of the low grade mineralization in this untested but previously discovered property is such that an active exploration program including several diamond drill holes is warranted.

The writer visited the property briefly in early spring and late fall and the following preliminary description is based on limited examinations carried out at the time. A description of the main showing by H. C. Gunning is enclosed in photocopy form.

LOCATION, ACCESS AND HISTORY:

The Meg Group of 22 mineral claims has been located to cover widespread copper mineralization occurring near Gem Lake at the head of the central fork of the Oyster River. Map GL #1 is a copy of the 1-mile-to-the-inch topographic sheet - West Half.

Gem Lake is about 18 miles west of the City of Courtenay on the central east coast of Vancouver Island. Present

access is either by way of helicopter direct or by float plane to Circler or Meak Lakes from where 2 miles of foot travel over a steep mountain ridge is necessary. Gem Lake is too small for Super-Cubs but could be used under favorable wind conditions and "toothbrush" loads if high trees at the Northern outlet were cut.

The nearest road is one servicing Comox Logging Company on Eric Creek, a branch of Cruickshank River about 3-1/2 miles to the southwest. A similar logging road which runs to a point 7 or 8 miles down the Oyster River is slated for a few mile southward extension in the near future. This latter is the only grade route possible to Gem Lake Valley. With the cooperation of logging companies a mining access road has been built to the top of Mt. Washington 7 miles to the northeast where Noranda Mines has a copper property under option.

The Oyster River marks approximately the northern boundary of a marked topographic feature known as the Forbidden Plateau. This range of lofty, flat-topped mountain peaks (it was named a "plateau" during a foggy day) extends north from Port Alberni being bounded on the west by Buttle Lake (Strathcona Park) and on the east by the Island Coastal Plain. Although on a somewhat subdued scale this little explored region possesses some of the most picturesque mountain scenery in B. C. and certainly the numerous, clear cut "amphitheatre-like" cirques are without a match for clarity anywhere in Western North America. Small glaciers leading into ice-choked lakes are common above the 5000 foot level. Mount Albert Edwards, immediately south of Gem Lake (and practically forming the footwall of one of our deposits) is the highest mountain

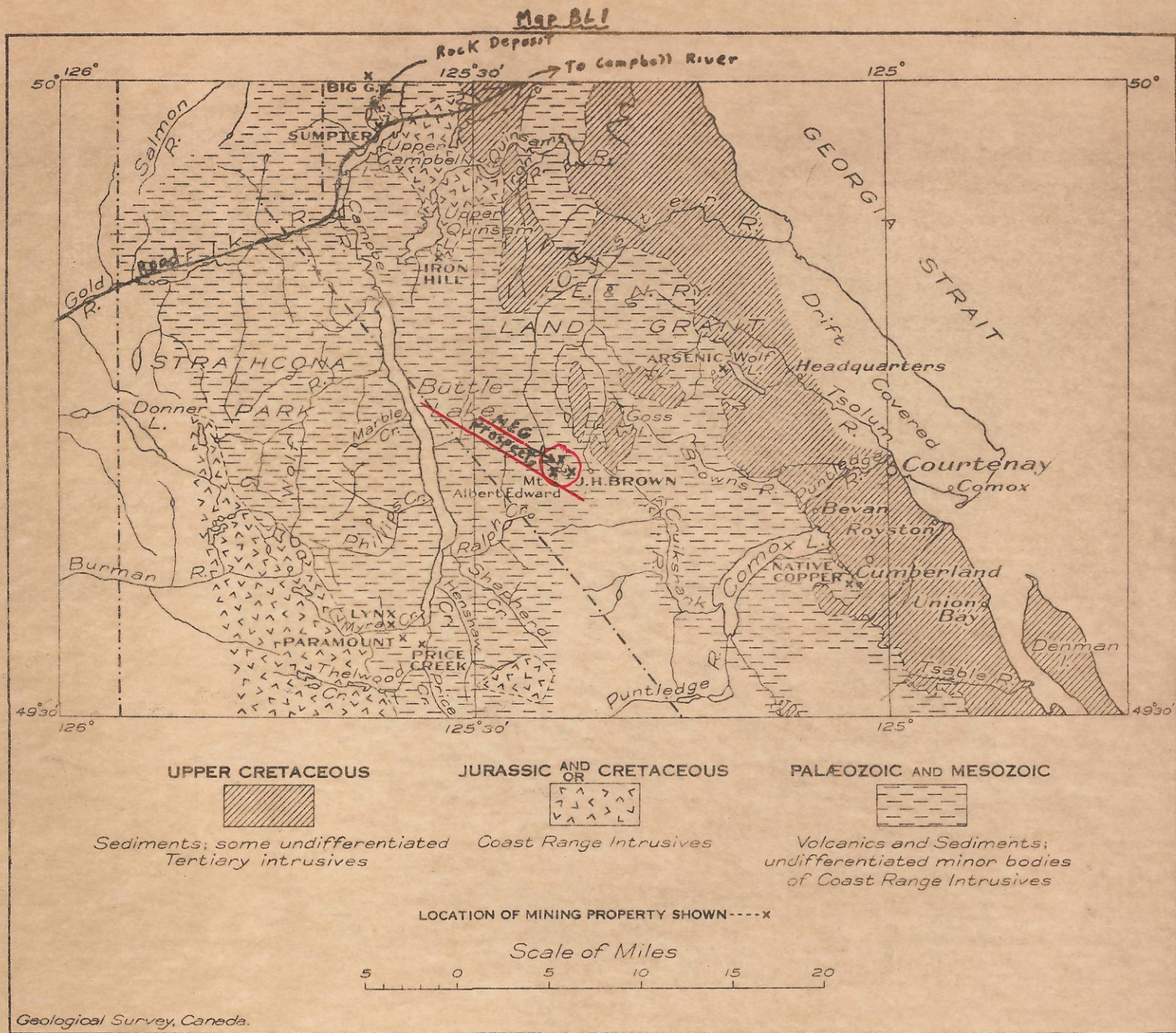


Figure 5. Buttle Lake area, Vancouver island, British Columbia.

(elevation 6868 ft.) of the plateau and one of the highest peaks on Vancouver Island.

The climate is similar to that prevailing at moderately high elevations elsewhere in the coast district although it is more agreeable in summer than most. Snowfall is heavy and increases rapidly above the 4000 foot level where it remains hampering travel well into June. During 1960 about 10 feet still covered Gem Lake (elevation 3400 ft.) late in April but was completely melted to the 4500 foot mark six weeks later. However that in slides under the unusually steep cliffs was not gone until July. The first lasting snowfall occurred late in November but is no heavier at the present date (mid-February) than then. The Oyster River Valley is presently snow free but the winter is not yet over.

Except for scattered scrub timber vegetation is generally lacking above the 3500 foot level (see Photo #1). Light timber is available at Gem Lake and it's quality increases rapidly down river.

The Gem Lake prospects were first discovered late in April while carrying out helicopter reconnaissance prospecting in geologically favorable, deeply dissected sections of the Forbidden Plateau. South of Gem Lake copper-stained cliffs visible only from low altitude were examined at their base and this led to the initial staking of the 12 Meg claims. Ten more were added late in the fall forming the maximum sized group now allowable under B. C. Law and 2 extra. Several weeks after this Alex Smith and the writer attempted to scale the top of the steep cliff in question but soon abandoned

this dangerous practice. However at the time an old rope was found dangling on the slope and a later check revealed that the ground in question was in all probability that examined and described by Gunning in 1930<sup>(1)</sup>. Since Gunning's report (a copy included here) no important or even recognizable work has been done on the property. Claims have been staked on and off in the general vicinity since but all have now lapsed. Smith made a second examination of the property in June. Late in November Gerry Davis and Al Pembroke were engaged to carry out required assessment work and a 40 foot rock cut was put in on a weakly mineralized outcrop easily (and safely) accessible on the west shore of Gem Lake. At the same time 2 heliport levellings were made on the steep talus slopes below and south of the cliff showings in anticipation of future work. Prospecting has been limited to one trip on which float around Gem Lake was examined. The frozen condition of the hillsides late in the fall make work along the steep 45° slopes extremely hazardous without proper climbing equipment.

The Meg claims are located several miles within the E. & N. Land Grant and a royalty, approximately as outlined in the 1925 Summary enclosed but open to negotiation, is payable to the railway company.

#### GENERAL GEOLOGY:

The general geology of the area is relatively simple if subdivisions of the extensive flat-lying volcanic masses is not attempted. Such has fortunately been done by Gunning and a copy of his regional map is enclosed (BL #1).

(1) G.S.C. Summary Report, 1930 pt. A.

The most pronounced geological feature of the Forbidden Plateau is the preponderance of massive, flat to gently dipping andesitic to basaltic flows. This group, of probably Triassic Age, is at least 5000 feet thick. Minor sedimentary bands occur near its top. Crystalline limestones, argillites and quartzites occur with an underlying formation containing considerable volcanic rock as well. These older volcanics of Permian or Post-Permian Age are distinguishable from the overlying ones as they lack the myriad of amygdaloids so well developed in the younger massive flows. Gunning's description of this area was made before he introduced the name "Karmutsen" to similar volcanics farther north. The writer would not hesitate, at least on field evidence, to include most of the Plateau rocks in the Karmutsen. The underlying older rock, particularly the quartzite member although not exposed may be of importance in solving geology of the Gem Lake section.

The Karmutsen volcanics are intruded by small granodiorite stocks and dykes, many of which, as clearly exposed by the steep prevailing slopes, failed to reach the present surface.

Cretaceous sediments occur to the east but are of no present interest.

Structure is simple in this section of the map area and consists mainly of broad, gentle open-folding in which the limb at Gem Lake dips to the northwest at angles not exceeding 25°. Several through-going east-west cross-faults are recognizable and are of possible interest. Some of these appear to be in turn offset a few hundred feet along



North-South creeks tributary to the Oyster River. Suchmay be the case south of Gem Lake.

DESCRIPTION OF PROPERTY:

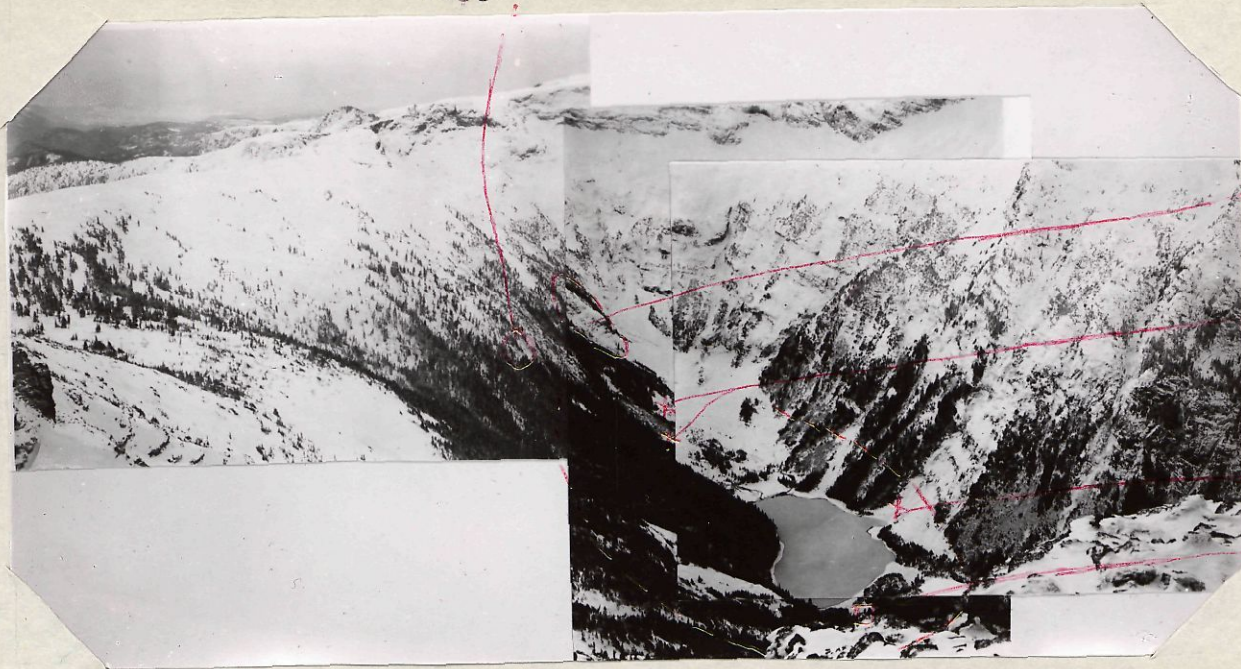
Gunning's description of the cliff showing is enclosed in photocopy form and only a few more notes need be added. Several features are best described by reference to Photo #1 and Map GL 1.

The breccia mineralization is restricted to the intrusive which would appear to be bounded by two east-west faults as shown on Map GL 1. The southernmost fault may be a branch of the other.

Our work on the main deposit included a partial examination on top of the cliff 400 feet above its base. Here local veinlets and gobs of chalcopyrite occur in a less brecciated volcanic rock cut by granodiorite dykes. The central 2/3rds of the cliff could not be reached.

The lower 50 feet of the cliff was examined in early May by the writer and later when snow-free by Alex Smith. As described by Gunning the mineralization covers a width of about 200 feet and would appear to increase in intensity, if coloration is a guide, toward the steep east-west fault marking the approximate south boundary. Mineralization also appears to increase with depth. As stated the overall copper grade is low but a good possibility exists of a higher grade band paralleling the fault in question but in an inaccessible section 20 or 30 feet north of it.

The visible minerals such as chalcopyrite, pyrrhotite, pyrite and magnetite are confined largely to the cementing



Cliff  
Showing

Hi-Grade  
Float

Cut in  
Volcanics  
(Photo #2)

Camp

Photo #1 - Looking South at Meg Lake and Vicinity.



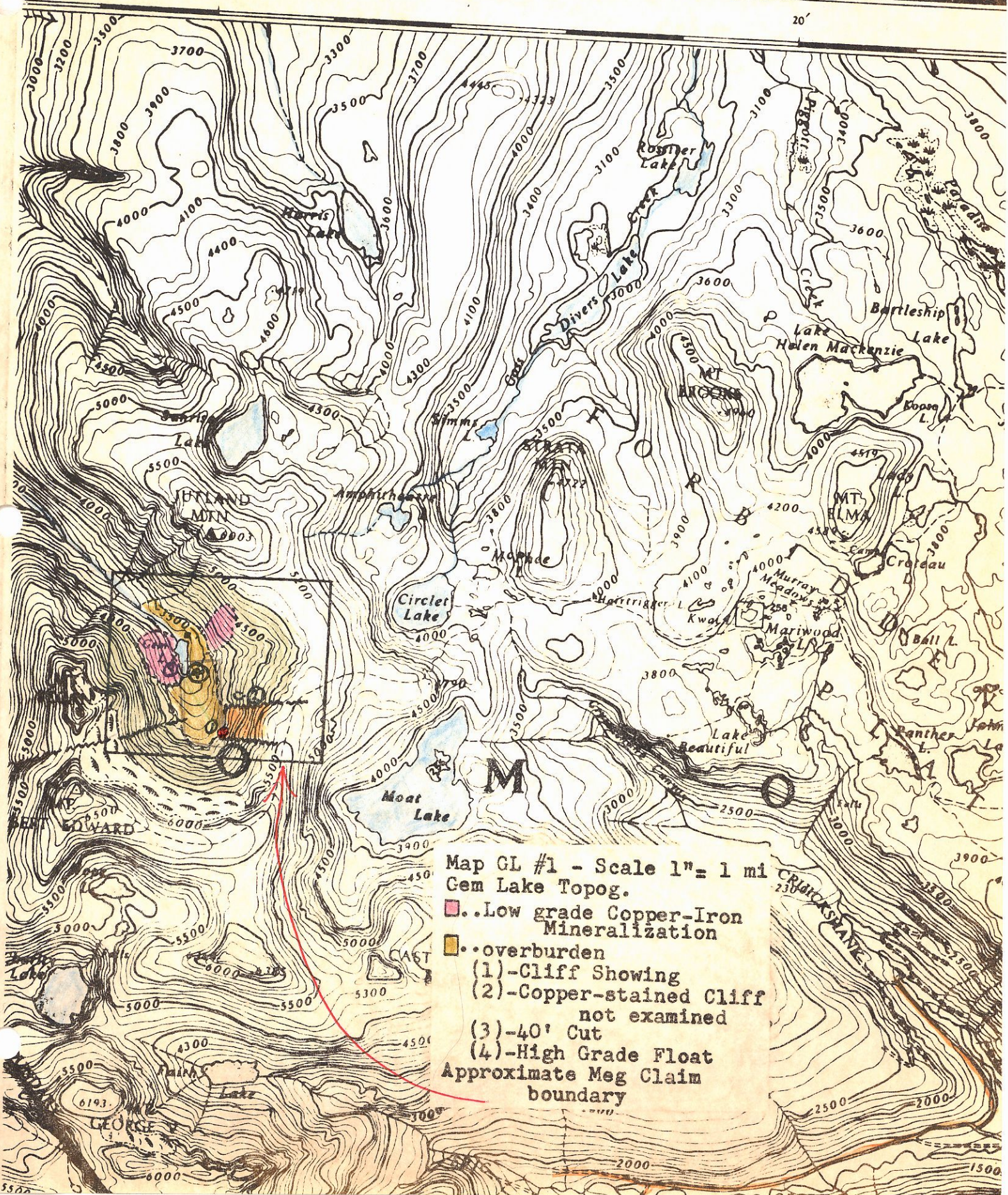
Steep Unexplored Hillside  
throwing Mineralized  
Float.

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Photo #2 Looking Southerly at cut in Mineralized Basaltic Volcanics. Chalcopyrite occurs along numerous joints. Note Cobra Drill.

25'

20'



Map GL #1 - Scale 1" = 1 mi  
 Gem Lake Topog.

- Low grade Copper-Iron Mineralization
  - Overburden
  - (1) - Cliff Showing
  - (2) - Copper-stained Cliff not examined
  - (3) - 40' Cut
  - (4) - High Grade Float
- Approximate Meg Claim boundary

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ESQUIMALT & NANAIMO RAILWAY COMPANY'S LAND.

The fact that practically one-third of Vancouver island is comprised within the boundaries of the land-grant to the Esquimalt & Nanaimo Railway Company in consideration of the building of that line from Esquimalt to Wellington, paralleling the east coast of Vancouver island, has been frequently referred to in former reports as acting as a strong influence against prospecting within its boundaries, for the reason that all base minerals such as copper, zinc, and lead occurring on the land-grant are owned by the railway company, while the precious metals only belong to the Crown.

As the regulations with regard to minerals occurring on the grant may have been misunderstood, it is deemed only fair to the company that the following regulations which are in force to-day with regard to minerals found on the company's lands should be made public in this report, as well as the fact that the entire land-grant is open to prospectors subject though to the following regulations:—

*Regulations.*

"Mineral lands, which include all lands supposed to contain minerals other than or in addition to coal and coal-oil. These lands will be leased or dealt with under option. Locators of mineral claims on the unsold portions of the land-grant may, on payment of \$50 per claim, obtain an option for one year to purchase the surface rights and timber at the price of \$5 per acre for the surface and \$1 per 1,000 for all timber in excess of 8,000 feet B.M. per acre. Minerals to be worked on royalty as specified in regulation below. The company does not, however, bind itself to grant options on, or sell, either the surface or timber of any land which it may decide is required for its own use or otherwise. Holders of options who intend to purchase must survey the land and file their field-notes at the company's land office at Victoria within the period of their option.

"Mineral lands will be leased at an annual rental or sold. The following royalties being reserved on the ores mined upon the property:—

"(a.) Upon iron ore (and this is to be understood as material containing over 40 per cent. metallic iron and manganese), 1 cent per unit of iron plus manganese on total contents; that is to say, should the ore contain 50 per cent. iron and manganese the royalty per ton would be 50 cents. A minimum royalty of 25 cents per ton.

"(b.) One-tenth of 1 cent per pound upon the lead contents of lead ore.

"(c.) One-twentieth of 1 cent per pound upon the zinc contents for the first forty units; one-tenth of 1 cent per pound upon the zinc contents in excess of forty units.

"(d.) One-tenth of 1 cent per pound upon copper contents up to and including 2 per cent. of copper contents; upon the first 1 per cent. in excess of 2 per cent. of copper contents, fifteen one-hundredths of 1 cent per pound; upon the first 1 per cent. in excess of 3 per cent. of copper contents, one-fifth of 1 cent per pound of copper contents; upon the first 1 per cent. in excess of 4 per cent. of copper contents, one-quarter of 1 cent per pound of copper contents; upon any copper contents exceeding 5 per cent. copper contents, three-tenths of 1 cent per pound upon such excess.

"(e.) A royalty of 2 per cent. of the gross value of ores or concentrates not otherwise specified."

The Mining Divisions on Vancouver island, portions of which are embraced within the boundaries of the land-grant, are as follows: Victoria, Alberni, and Nanaimo.

"groundmass". Talus below the cliff contains material probably more representative of the upper cliff and in it chalcopryrite can be found almost anywhere. Flakes of molybdenite are occasionally present.

Our views differ to or at least enlarge upon those presented by Gunning in that we suggest a possible intrusive origin for the breccia which contains an abundance of quartz-diorite blocks. Such would be similar to that with which the Highland Valley copper deposits near Ashcroft are associated. Thin section study by the writer suggests also the possibility of introduction of foreign material during emplacement of the breccia. The breccia particles in large part are composed of blocks of white to gray granular rock mixed with obvious volcanic country rock. The cementing material is identifiable only as a highly altered chloritic material andesitic in composition but now replaced largely by chalcopryrite plus iron sulphides and magnetite. Besides those of obvious quartz-diorite composition many of the light-colored blocks consist of fine-grained quartz and chlorite with two ages of each clearly visible. Up to 3% apatite is present. Feldspar is totally lacking in shape and form. The writer can see no obvious connection between this latter material and country rock volcanics as suggested by Gunning nor to the intrusive granodiorite. On the other hand quartzite is a distinct possibility. Such rock occurs below the Karmutsen in a Permian or Post-Permian sequence and could well have originated there. Close examination however might locate it in the Gem Lake Valley believed by the writer to have been excavated very

near if not beyond the poorly defined base of the Karmutsen.

The importance of a mineralized intrusive breccia or even a ruptured quartzite bed at depth is obvious from a possible tonnage standpoint as continuity is almost certain to exist. Grade can change.

The second and most widespread type of deposit is that occurring around Gem Lake itself. A rusty weathering poorly outlined volcanic rock assumed to underlie an area of at least 2,000,000 square feet crops out on both sides of the lake reaching elevations of at least 500 feet above it. The rock is definitely an andesite composed of feldspar (AN38) and chlorite with only a trace of quartz. The chlorite and an unusually high content of disseminated metallic tend to darken the rock considerably leading to its erroneous field classification as a basalt. Some of this rock is light in color and composed of up to 70% feldspar (AN32). Recognisable mafics are notably absent in both the light and dark rock and the widespread development of chlorite attests to the degree of metamorphism undergone. The rock is highly fractured and practically every joint has a coating of chalcopyrite, pyrrhotite and pyrite - such giving an exaggerated picture of its true metallic content. This fact was brought home by sampling of a 40 foot cut in country rock put in for assessment purposes. The best 10 foot section of this deposit (chosen only because of ease of access) returned copper values of 0.36% and gold-silver values of \$2.30 per ton. Nevertheless interest remains in this type of deposit until we are reasonably certain that concentrations of metallics

do not exist. Possible tonnages might well be computed in the hundreds of millions. The writer has grown to respect this type of rock as the only "within-range" answer as a source for many of our metallic mineral deposits.

ASSAYS AND RESERVES:

Insufficient work has been done to even hazard a guess as to possible reserves. Suffice it is to say that the property will not be turned down for lack of reserves.

Grade, except for that shown by our 40 foot cut, is uncertain as such cannot be accurately determined unless bulk sampling of an unweathered surface is undertaken. Local, entirely unrepresentative sampling in the cliff area has given copper values ranging from 0.3% to 3.0%. Gold values to date unfortunately do not reach the relatively high figure of 0.3 ounces quoted by Gunning from talus slope sampling and would appear to be in the 50¢/ton range. The writer would estimate the overall grade expected across presently exposed widths to be no greater than 1% and probably only half of this. A small but possibly widespread magnetic iron content of about 10% to 15% is indicated.

Sampling of float from as yet concealed nearby deposits indicate grades of several percent copper and much of the float around the shores of Gem Lake will assay 1%.

CONCLUSIONS AND RECOMMENDATIONS:

The Meg Lake prospect exists in an environment geologically suited to the development of extremely large tonnages of low-grade copper. It is considered a geological

bet in which concentrations obviously required can only be determined present with the aid of several diamond drill holes directed to probe structurally favorable sections of the intrusives at depth below the cliff and under the extensive talus slope. The widespread and continuous nature of the copper mineralization coupled with the structural possibilities and the relative nearness to the coast (not entirely convincing when viewed from Gem Lake!!) make it an attractive prospect on which to concentrate a moderate exploration program.

It is recommended that a geological survey be made of the crater-like Gem Lake Valley. Photographic Surveys, possessing their own coverage, could produce a 400 scale map (for about \$300.) which would save us considerable time.

Two diamond drill holes should be directed downward and across the cliff showing from a set-up either at its southern or northern base depending entirely on safety conditions at the time. The holes, which will probably be put in by our Longyear Drill run to its limit of 300-400 feet, should be carefully analyzed for changes in grade and rock type. Coupled with the geological survey should be some magnetometer work designed to pick up possible anomalies caused by concentrations of the minor magnetite related to the copper mineralization. Such may be detected with a more sensitive Proton-type air mag which we contemplate purchasing. We should also investigate the possibilities of IP working satisfactorily on this type of mineralization. Certainly SP and EM methods or wide scale soil sampling do not appear attractive. Photographic



Surveys are bringing in an IP unit and we should try to learn as much as possible about this apparatus even if it does not find us a mine. Our Toronto Department should be asked for comment on this.


Fortunately Vancouver Island is almost entirely covered by mile-to-the-inch topog maps and much detail is available through excellent photography carried out for the logging companies. Thus if Photographic Surveys can supply us with a 400 scale map of the 2 square mile area for a reasonable cost (\$300.) considerable surveying might be eliminated and more concentration given prospecting and locating future drillsites.

We have several leads regarding mineralization in the vicinity and these should be looked into. Claim lines should be better marked than the writer was able to do at the time of staking.

A workable crew should consist of five or six men including two drillers and a cook-handyman. Radio communication is important especially if the helicopter whose presence much of the program is based on is not always available. One of our Super-Cubs could be left as "standby" on "near but far away" Circlelet or Moak Lakes.

During average years it would be useless to start such a program before June but with the light snow conditions prevailing at the present date (mid-February) early May might be a possibility.

Vancouver, B. C.  
February 15th, 1961.

  
\_\_\_\_\_  
Jas. J. McDougall,  
Geologist

MINERALIZATION ON AND NEAR MOUNT ALBERT EDWARD

Mount Albert Edward, at the headwaters of Cruickshank, Oyster, and Ralph rivers, is over 6,800 feet high and is easily ascended by trail from the Forbidden plateau to the north. It is composed entirely of volcanic rocks including pillow lava, andesite, dacite, and breccia cut by a variety of diabase and other basic dykes, all intruded by two or three small bodies and many associated dykes of granodiorite. The volcanics are poorly bedded, their strike varying from north 60 degrees east to north 80 degrees east and their dip from 10 degrees to 20 degrees north. A pronounced system of jointing trends northeast.

On the lower northern slopes of the mountain, near Circle lake, a number of "veins" or replacement zones, varying in width from a few inches to 20 feet, have been found in the volcanic rocks. J. H. Brown of Cumberland has traced one such vein from an elevation of 4,300 feet just south of Circle lake, up the steep mountain side for at least 400 feet vertically. It strikes northwest and dips steeply southwest. This "vein" varies in width up to a maximum of 20 feet, but in its thicker parts is but sparsely mineralized with pyrite. At the lower showing there is a width of 4 feet containing much pyrrhotite, a little chalcopyrite, and some quartz. On a shoulder at 4,800 feet elevation, pyrite and chalcopyrite are sparingly developed in two undeveloped showings of quartz. No development has been done on any of these showings.

Mr. Brown's principal holdings are in a deep and precipitous valley that lies immediately north of Albert Edward peak and drains west into Oyster river. To reach the showing from the east or north one must cross a summit 5,100 feet or more above sea-level. On the north side of the valley, at about 4,000 feet elevation, andesitic flows and breccias and associated feldspar porphyries are cut by numerous aplite and granodiorite dykes and by a small, stock-like intrusion of granodiorite that contains many fragments of the volcanic rocks. The volcanics and the granodiorite are extensively jointed and fractured and mineralized with irregular, tiny seams and lenses of pyrite and chalcopyrite with occasional quartz, magnetite, and molybdenite. The mineralization appears to be entirely confined to tiny seams or cracks and was not found to replace the country rock to any appreciable extent. The most encouraging showing is a bluff, some 300 feet long and about the same height, which is extensively coloured with iron and copper stains. As the wall is vertical or overhanging it cannot be examined without ropes or ladders, but there is a large collection of blocks and fragments of the mineralized material at the base. The writer examined much of this material carefully and, although there is much chalcopyrite and pyrite present, yet there is so much absolutely barren rock between the mineralized cracks or seams that it seemed very doubtful if any large quantity of the rock would contain a commercial proportion of copper. Thus it seemed that unless gold or silver were present in appreciable amount the deposit would be of very doubtful value. Consequently, a sample, weighing over 2 pounds, of about as well-mineralized material as could be found and certainly containing much more pyrite and chalcopyrite than the average, was taken. On assaying it was found to carry per ton of 2,000 pounds: gold, 0.3 ounce; silver, 0.49 ounce; and copper, 4.07 per cent. Judging by this, high gold or silver values may not be expected. However, it must be admitted that in deposits of this sort extensive, large-scale sampling of unweathered surfaces is generally necessary before any reliable average values can be obtained.